

HOT-42: Chief Scientist Report

Chief Scientist: D. HEBEL

HOT 42 Cruise Report

R/V Kila

23-25 Nov. 1992

Personnel List:

Dale Hebel	Chief Scientist	UH
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WOCE group:

No representatives

JGOFS group:

John Dore	Graduate Student	UH
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Chris Carrillo	Technician	UH
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Ancillary projects

Emerson's O2 project:

Chuck Stump	Technician	UW
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Campbell's Picoplankton project:

No representatives

STAG:

No representatives

Itinerary (approximate local time):

Monday, 23 Nov.

0830 Departed Snug Harbor

1200 Arrived Kahe Pt. (Sta. 1)

1600 Departed Kahe

Tuesday, 24 Nov.

0200 Arrived ALOHA (Sta. 2)

0230 Commenced hydrocasts

1700 Completed hydrocasts

1830 Departed ALOHA

Wednesday, 25 Nov.

0730 Arrived Snug Harbor

Narrative:

HOT 42 represented a major deviation from our routine cruise scenario. The cruise was conducted aboard the R/V Kila with Ross Barnes as Master. The total cruise duration was approximately 48 hrs and due to the lack of a conducting wire winch we were restricted to hydrocasts composed of twelve 10 and 12 liter Niskin bottles hung from 1/4" (?) kevlar line. Due to the length of the kevlar line and the short cruise time frame we were limited to casts within the upper 250 m. Even if we had additional line the Seacat internal recording CTD pressure transducer was only rated to 500 m. This did not represent a major obstacle for the JGOFS component since most of our samples are collected in the upper 250 m. In addition to the relatively shallow casts we did not deploy the sediment traps or primary productivity arrays.

Although the cruise time frame was very short we were able to collect most of our core water column samples both at Kahe Pt. and ALOHA. This was only possible due to relatively benign sea conditions. At Kahe we conducted the usual PNF and the first kevlar cast. The cast went smooth enough, however, a number of the samples were lost due to the red silicon (?) O rings pulling out of the O ring groove. These were reseated and we did not experience a continuation of the problem, however, we were assiduous to check the O rings after we cocked each bottle on the following casts. It is possible that the silicon elastic band may have pulled the O rings out of the groove during our initial cast or that they were not properly seated to begin with. Another problem which became apparent at Kahe was the apparent malfunctioning of the transmissometer. Although, the recordings were continued through the remainder of the cruise it is unlikely that the data will be good. In addition, the salinity profiles were very noisy. A serious malady of the short cruise time frame is that only limited troubleshooting can be accomplished (usually during transit when you need to sleep), and that once on station any equipment problems will result in the loss of samples.

At station ALOHA 7 casts were completed. Two were to 50 m for C. Stump's respiration experiments and the remainder were 12 bottle casts to 250 m where samples for both UW and UH were collected. Samples collected included DO, DOC, Chl a (f), inorg. nutrients, LLP, NOx, pH, Alk, refrig'd Si, on-deck temp's, pCO₂, UW DO, UW Oxy/Ar, Keeling DIC, PPO₄, PC, PN, HPLC pigments, bacteria, flow cytometry samples, and salts. The sample collection and processing covered 18 hrs with a cast and sample collection duration of approximately 1 hr each conducted by 4 experienced personnel. This does not include post sample collection processing, Seacat data uploading, or station keeping positioning. In addition, 3 PNF casts were completed.

It should be emphasized that the primary factor in our limited sample collection success was the relatively calm sea conditions and secondarily the dedication of a very experienced scientific contingency. The very limited laboratory space and load capacity are real deterrents for high quality scientific work and will preclude involvement of ancillary scientific endeavors. Although the Captain and crew provided excellent support, it is my opinion, that the vessel is

substandard relative to our needs and should only be considered as a last resort measure.

Weather:

The weather was good at station ALOHA with light NNE winds ranging from 11-15 kts and mostly sunny skies. Due to the uncharacteristic light winds the sea state was relatively calm with the swell ranging from 2-3 m.

Equipment and methods:

All equipment used on HOT 42 was atypical relative to past HOT cruises. We used our DSE winch with kevlar line and twelve 10 and 12 l General Oceanic Niskin bottles. Bottles were manually attached and removed for each cast over a depth interval of 250 m. At the terminal end of the Kevlar line was an SBE-19 Seacat internally recording CTD with transmissometer. The conductivity and temperature sensors were compared to our regular CTD sensors in the calibration laboratory prior to the cruise as well as the voltage output of the transmissometer. At sea the salinity data was very noisy and the transmissometer did not appear to work properly. During the transit to Kahe Point the Kevlar line was marked at 10 m intervals with the depth and orange fluorescent paint starting at 250 m. Five meter increments were also marked with black paint but without the depth. The Seacat was suspended 9 m below the 250 m mark. Niskin bottles were hung at either 10 m or 5 m increments over the 250 m depth range as recorded on our cast data sheets.

Ancillary programs:

Investigator:

Steve Emerson (UW)
Charles Keeling (SIO)
Lisa Campbell (UH)

Project:

O2, respiration, and DO
intercalibration
CO2 dynamics and inter calibration
Picoplankton studies

Students:

No time or energy

Others:

Taro Takahashi pCO2 inter calibration (C. Winn P.I.)